

Approved
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Specification (cleaned-up version):

DOWNHOLE DRAW DOWN PUMP AND METHOD

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BACKGROUND OF THE INVENTION

This invention relates to a downhole pump. More particularly, but not by way of limitation, this invention relates to a downhole draw down pump used to withdraw fluid from a wellbore and method.

10 In the production of oil and gas, a well is drilled in order to intersect a hydrocarbon bearing deposit, as is well understood by those of ordinary skill in the art. The well may be of vertical, directional, or horizontal contour. Also, in the production of natural gas, including methane gas, from coal bed seams, a wellbore is drilled through the coal bed seam, and methane is produced via the wellbore.

15 Water encroachment with these natural gas deposits is a well documented problem. Once water enters the wellbore, production of the hydrocarbons can be severely hampered due to several reasons including the water's hydrostatic pressure effect on the in-situ reservoir pressure. Down hole pumps have been used in the past in order to draw down the water level. However, prior art pumps suffer from several problems that limit the prior art pump's usefulness.

20 This is also true of wellbores drilled through coal beds. For instance, in the production of methane from coal bed seams, a sump is often times drilled that extends past the natural gas deposit. Hence, water can enter into this sump. Water encroachment can continue into the wellbore, and again the water's hydrostatic pressure effect on the in-situ coal seam pressure can cause termination of gas production. As those of ordinary skill will recognize, for efficient
25 production, the water in the sump and wellbore should be withdrawn. Also, rock, debris and